Docket No.: 80154(302728)
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Takashi Yamaguchi et al.

Application No.: 10/539,884 | Confirmation No.: 6471

Filed: June 16, 2005 | Art Unit: 1791

For: COMPOSITE OF ALUMINUM MATERIAL AND SYNTHETIC RESIN MOLDING AND PROCESS FOR PRODUCING THE SAME | Examiner: D. N. Bodawala

DECLARATION PURSUANT TO 37 C.F.R. 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Masao Yamaguchi, hereby declare and state as follows:

1. I am one of the inventors of the invention as claimed in the above-identified application, and accordingly, I am familiar with the specification and claims which comprise this application.
2. Currently, I am employed at Corona International Corporation as a Vice President of development. I have worked at Corona International Corporation since 2000.
3. I received my higher education at Tamagawa University, obtaining a bachelor degree in technology.

4. In particular I, or people under my control, performed comparative tests of the composites disclosed in unexamined patent publication No. JP 2002-302795 and the claimed composite produced by the claimed invention in application No. 10/539,884.

5. The method of the comparative tests used is as follows:

Materials used for the tests:

Aluminum material	A730, 3.0mm thick plate
Resin material	Duranex PBT 531HS

Devices used for the tests: Tension tester, Shimadzu Corporation AGS-J5KN
Injection molding machine, Japan Steel Works, Ltd., JT100ELⅢ-110V

(1) The aluminum materials were subjected to the anodic oxide treatments in accordance with EXAMPLES 1～8, paragraph 0030 disclosed on page 4, column 6 of JP '795 as shown in Table 1 below.

Table 1

	Primary voltage V1 (V) + time (s)	Secondary voltage V2 (V) + time (s)	Phosphoric acid concentration (%)	Phosphoric acid temperature (℃)
Ex1	15 (V) +10(s)	10 (V) +10 (s)	10	30
Ex2	12 (V) +10(s)	8 (V) +10 (s)	10	30
Ex3	30 (V) +10(s)	15 (V) +10 (s)	10	30
Ex4	35 (V) +10(s)	30 (V) +10 (s)	10	30
Ex5	20 (V) +10 (s)	10 (V) +10 (s)	10	30
Ex6	35 (V) +10 (s)	20 (V) +10 (s)	10	30
Ex7	10 (V) +10 (s)	5 (V) +10 (s)	10	30

(2) The aluminum materials were subjected to the anodic oxide treatments in accordance with EXAMPLE 1, paragraph 0054 in the specification as shown in Table 2 below.

Table 2

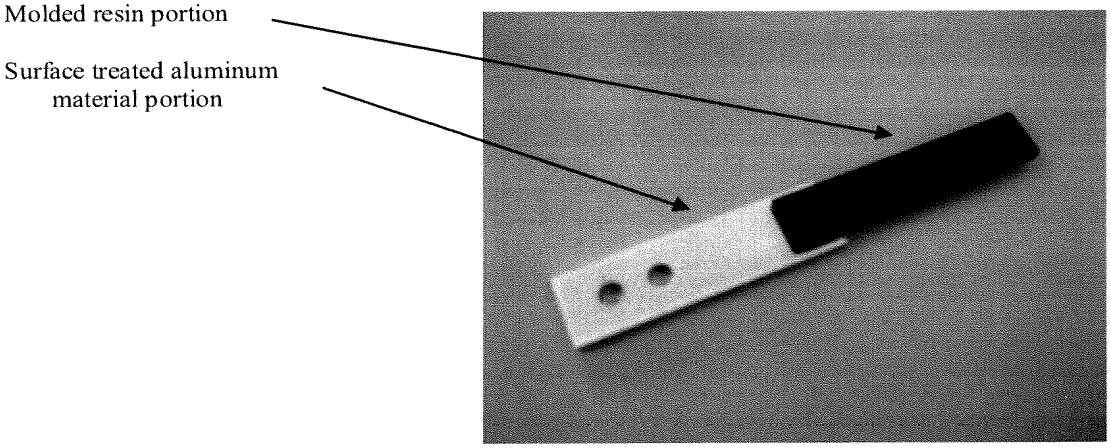
	Primary voltage (V) + time (s)	-	Phosphoric acid concentration (%)	Phosphoric acid temperature (℃)
Ex1	55 (V) +1200 (s)	-	30	18

(3) The surface treated aluminum materials having anodic oxide films made in the surfaces of the aluminum materials thus obtained respectively by EXAMPLES 1～7 of JP '795 and by EXAMPLE 1 of the present application were applied to the above-mentioned injection molding machine under the conditions as shown in Table 3 below, so that samples of respective composites were produced.

Table 3

Injection pressure (IP) 80MPa	Injection packing 6s
Injection velocity (IV) 60mm/s	Packing switchover 5mm
	Cooling time 20s
Packing 60MPa	Nozzle retraction position 8mm
Metal mold temperature 120℃	Nozzle temperature △270/260/250/240/230
Residual quantity 1.28mm	Injection pressure 32.6MPa
	Back pressure 6.1MPa

(4) Each example of the composite in which the molded resin portion and the surface treated aluminum material portion are adhered together. One of the composite samples is shown in a photo below. An adhered area of the composite is 1cm2.



(5) For measuring respective tensile strength of each composite sample by the above-mentioned tension tester, each sample was to be pulled by the tension tester. In this case, all of eight pieces of each of the composite samples of which the surface heated aluminum materials were made by Example 1,2,3 and 7 were such that the molded resin portion and the surface heated aluminum material portion were separated from each other before the composite sample were mounted on the tension taster as shown in photos 1, 3 and 7 below. Seven pieces or six pieces out of eight pieces of each of the composite samples of which the surface treated aluminum material were made by Example 5 or Example 6 were separated from each other before mounted on the tension tester as shown in photos 5 and 6 below. All of eight pieces of the composite sample and those of the composite samples of which the surface treated aluminum material were made by Example 4 of JP '795 and EXAMPLE 1 of the present application were retained in the mutually adhered state as shown respectively in photo 4 and photo 8.

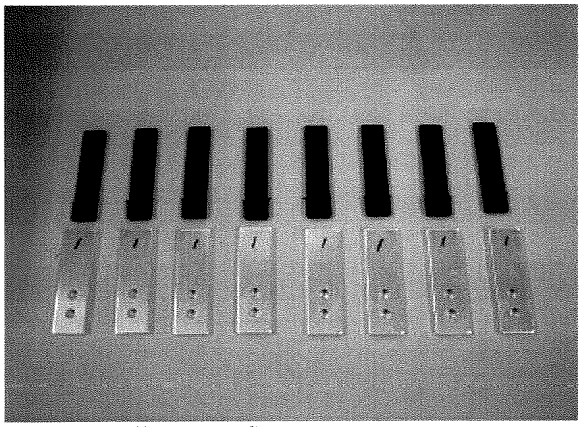


Photo 1 (all separated)

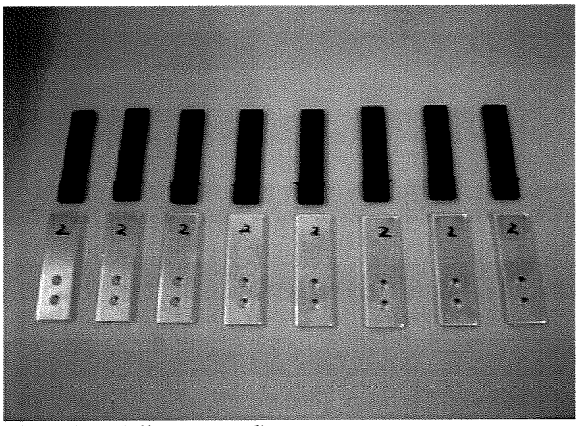


Photo 2 (all separated)

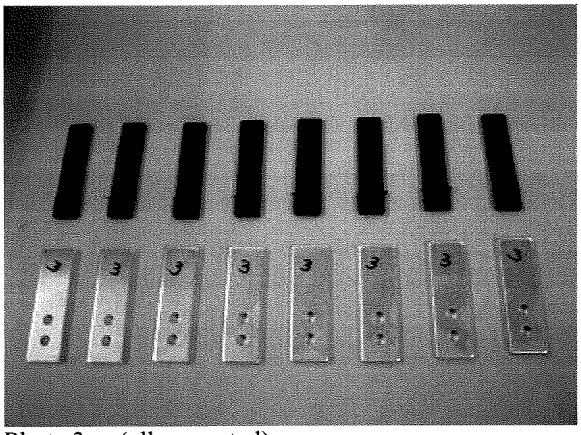


Photo 3 (all separated)

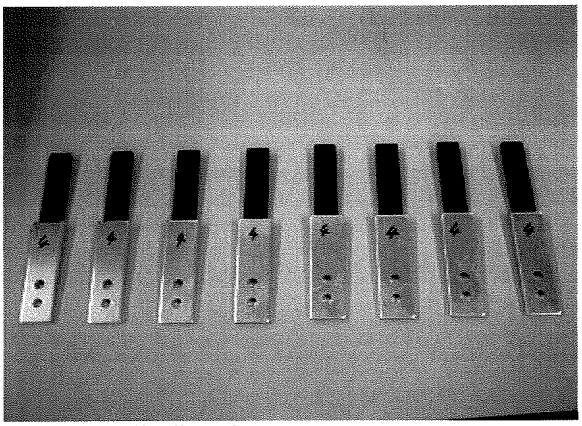


Photo 4 (all adhered)

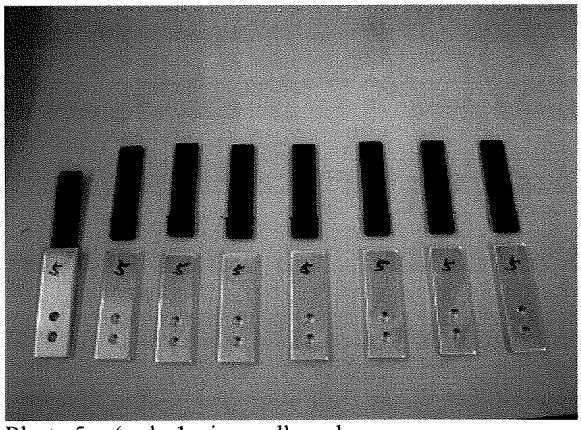


Photo 5 (only 1 piece adhered.
7 pieces separated)

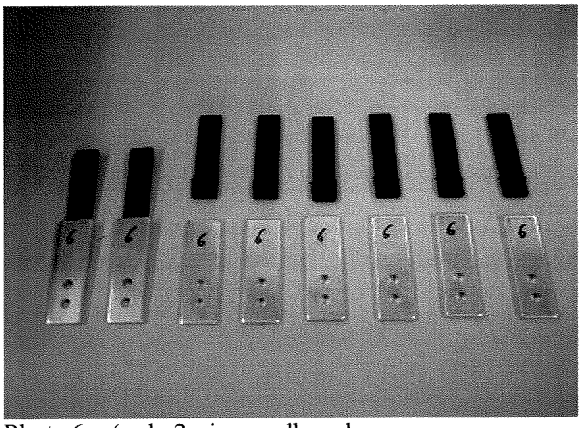


Photo 6 (only 2 pieces adhered.
6 pieces separated)

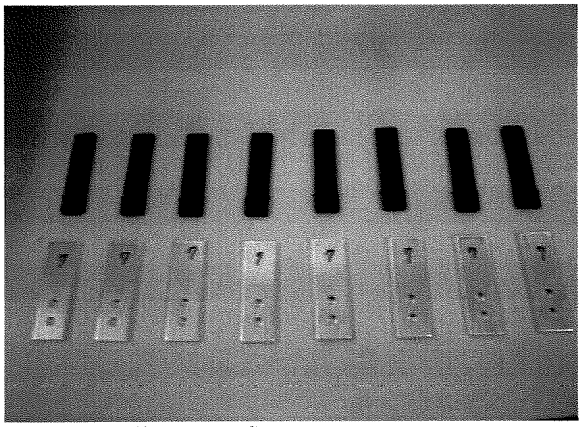


Photo 7 (all separated)

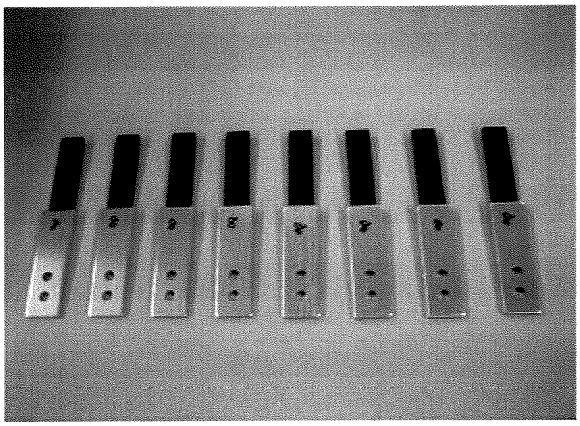


Photo 8 (all bonded)

Evaluation of the tension strength:
Eight pieces of the composite sample as shown in the photo 4 produced according to the process disclosed in JP '795 and eight pieces of the composite sample as shown in the photo 8 produced according to the process of the present application were measured by the tension tester by pulling the molded resin portion thereof by the tension tester in the horizontal direction until it was peeled form the surface treated aluminum portion thereof.

Results of the tension strength (fkg/cm2) thus obtained are shown in Table 4 below.

Table 4

Number of pieces	Sample in photo 4 of JP'795	Sample in photo 8 of the present application
1	50	99.2
2	63.8	88.4
3	42.7	92.4
4	50.6	100.6
5	19.8	66.3
6	48.9	92.6
7	28.6	93.6
8	66.4	99.2
Average value	46.35	91.54

Unit (fkg/cm2)

The sample of JP'795 showed an average of 46.35fkg/cm2, whereas, the sample of the present application showed an average value of 91.54fkg/cm2 which is about twice as strong as the tensile strength of the sample of JP'795.

Conclusion:

The claimed composite of the present application has a tensile strength greater than that disclosed in JP'795.

Ⅱ)Vertical tension test:

Materials used for the test: Aluminum material A1050, dimension: 50×70mm, 0.6mm-thick plate
Resin material Duranex PBT 531HS

Devices used for the test: Tension tester, Shimadzu Corporation AGS-J5KN
Injection molding machine, Japan Steel Works, Ltd., JT100ELⅢ-110V

(1) The aluminum material was subjected to the anodic oxide treatment in accordance with Example 4, paragraph 0030 disclosed on page 4, column 6 of JP '795 as shown in Table 4 below.

Table 4

	Primary voltage V1 (V) + time (s)	Secondary voltage V2 (V) + time (s)	Phosphoric acid concentration (%)	Phosphoric acid temperature (℃)
Ex4	35 (V) +10(s)	30 (V) +10 (s)	10	30

(2) The aluminum material was subjected to the anodic oxide treatment in accordance with EXAMPLE 1, paragraph 0054 in the specification of the present application, as shown in Table 5 below.

Table 5

	Primary voltage (V) + time (s)	-	Phosphoric acid concentration (%)	Phosphoric acid temperature (℃)
EX1	55 (V) +1200 (s)	-	30	18

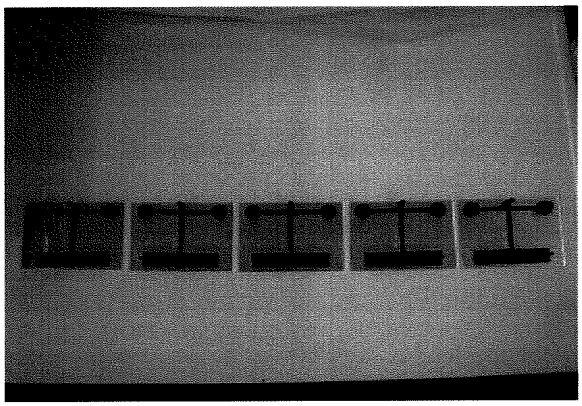
(3) The surface treated aluminum materials having anodic oxide films made in the surface of the aluminum materials thus obtained respectively by Example 4 of JP '795 and by EXAMPLE 1 of the present application were applied to the above-mentioned injection molding machine under the conditions as shown in Table 6 below, so that samples of respective composites were produced.

Table 6

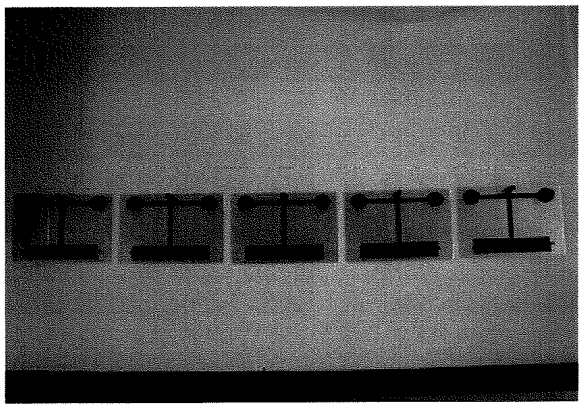
Injection pressure (IP) 80MPa	Injection packing 6s
Injection velocity (IV) 60mm/s	Packing switchover 6.6mm
	Cooling time 20s
Packing 60MPa	Nozzle retraction position 8mm
Metal mold temperature 120℃	Nozzle temperature △270/260/250/240/230
Residual quantity 5.69mm	Injection pressure 32.6MPa
	Back pressure 6.1MPa

(4) Five pieces of the composite having the molded resin portion adhered to the surface treated aluminum material of Example 4 of JP '795 and five pieces of the composite having the molded resin portion adhered to the surface treated aluminum material of EXAMPLE 1 of the present application were produced by the above-mentioned injection molding.

Respective five pieces of the composite samples are shown in respective photos below.



Five pieces of the composite sample of JP '795

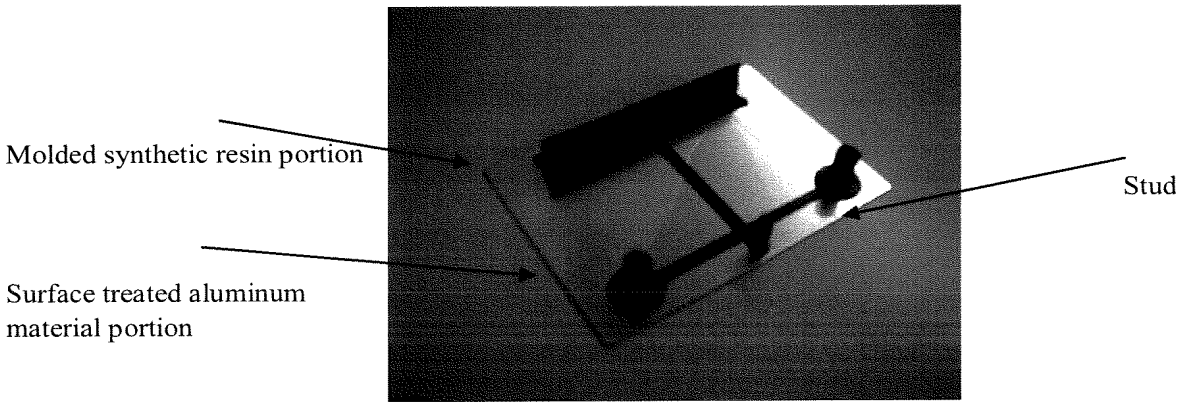


Five pieces of the composite samples of the present application

(5) Tension test:

A piece of the composite as s sample thus produced is shown in a photo below. An adhesion area between the surface treated aluminum material portion and the molded synthetic resin portion was 1.0 cm2.

Before applying the tension tester to each piece of the composite samples, a screw was screwed into the stud of the synthetic resin portion adhered to the surface treated aluminum material portion of each piece the composite samples, piece of the composite samples was pulled upwardly in the vertical direction by the tension tester.



Evaluation of the vertical tension strength:

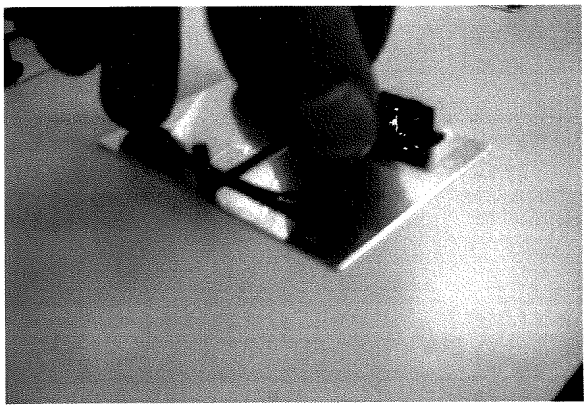
The results of the tension tests are shown in Table 7 below.

Table 7

Piece No.	Composite sample of JP '795	Composite sample of the present invention
1	8.6	22.5
2	11.5	28.8
3	7.0	26.7
4	6.1	29.2
5	4.5	27.3
Average value	7.54	26.9

(kgf/cm2)

More in detail, all of the studs of the piece Nos.1～5 of the composite sample of JP '795 were peeled from the treated aluminum material portion as shown in photo below, at the respective tensile strength values as above.



Whereas, in the case of the composite sample of the present application, the stud of the piece No.1 was peeled tensile strength value as shown in Table 7 above. The studs of the pieces No.2 and No.4 were broken at the of the studs at the respective strength values in Table 7 without being peeled there from.

The studs of the pieces No.3 and No.5 were peeled at the respective strength values in Table 7.

Conclusion:

The claimed composite of the present application has a vertical tensile strength greater than that disclosed in JP '795.

6. In conclusion, the forgoing comparative tests show the chemical difference between the claimed composite and that of JP'795

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Oct 30, 2009

By: _____

Masao Yamaguchi